HTN070A03 P-1

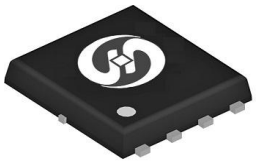
30V N-Ch Power MOSFET

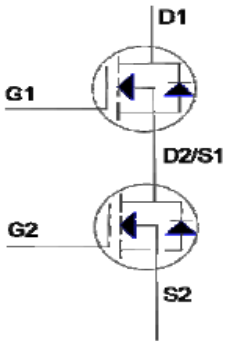
Feature
- ◇ High Speed Power Switching, Logic Level
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free, Halogen Free

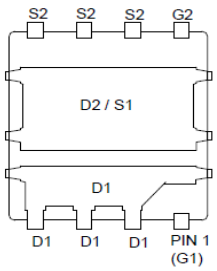
	Q1	Q2	V
V_{DS}	30	30	V
$R_{DS(on),max}$	7	3.5	mΩ
I_D	46	78	A

Application
- ◇ Hard Switching and High Speed Circuit
- ◇ DC/DC in Telecoms and Industrial

DFN5x6







Part Number	Package	Marking
HTN070A03	DFN5x6	TN070A03

Absolute Maximum Ratings at T_j=25℃ (unless otherwise specified)

Parameter	Symbol	Conditions	Q1	Q2	Unit
Continuous Drain Current (Silicon Limited)	I_D	T_C=25℃	46	78	A
		T_C=100℃	29	49	
Drain to Source Voltage	V_{DS}	-	30		V
Gate to Source Voltage	V_{GS}	-	±20		V
Pulsed Drain Current	I_{DM}	-	80	120	A
Avalanche Energy, Single Pulse	E_{AS}	L=0.1mH, T_C=25℃	20	80	mJ
Power Dissipation	P_D	T_C=25℃	28	37	W
Operating and Storage Temperature	T_J, T_{stg}	-	-55 to150		℃

Absolute Maximum Ratings

Parameter	Symbol	Q1 Max	Q2 Max	Unit
Thermal Resistance Junction-Ambient (t<=10S)	$R_{\theta JA}$	27	24	℃/W
Thermal Resistance Junction-Ambient (Steady State)		62	55	℃/W
Thermal Resistance Junction-Case	$R_{\theta JC}$	4.4	3.4	℃/W

Q1 Electrical Characteristics at T_j=25℃ (unless otherwise specified)

Static Characteristics

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250μA	1	1.5	3	
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V, V_{DS}=24V, T_j=25℃	-	-	1	μA
		V_{GS}=0V, V_{DS}=20V, T_j=125℃	-	-	25	
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Drain to Source on Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=12A	-	5.5	7	mΩ
		V_{GS}=4.5V, I_D=9A	-	7	9.5	
Transconductance	g_{fs}	V_{DS}=5V, I_D=13A	-	50	-	S
Gate Resistance	R_G	V_{GS}=15mV, V_{DS} =0V, f=1MHz	-	2.5	-	Ω

Dynamic Characteristics

Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, f=1MHz	-	975	-	pF
Output Capacitance	C_{oss}		-	168	-	
Reverse Transfer Capacitance	C_{rss}		-	95	-	
Total Gate Charge	Q_g(10V)	V_{DD}=15V, I_D=10A, V_{GS}=10V	-	17.0	-	nC
	Q_g(4.5V)		-	8.7	-	
Gate to Source Charge	Q_{gs}		-	3.0	-	
Gate to Drain (Miller) Charge	Q_{gd}		-	2.8	-	
Turn on Delay Time	$t_{d(on)}$	V_{DD}=15V, I_D=1A, V_{GS}=10V, R_G=2.7Ω,	-	8	-	ns
Rise time	t_r		-	10	-	
Turn off Delay Time	$t_{d(off)}$		-	20	-	
Fall Time	t_f		-	15	-	

Reverse Diode Characteristics

Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_F=10A	-		1.2	V
Reverse Recovery Time	t_{rr}	I_F=10A, dI_F/dt=100A/μs	-	20	-	ns
Reverse Recovery Charge	Q_{rr}		-	11	-	nC

Fig 1. Typical Output Characteristics

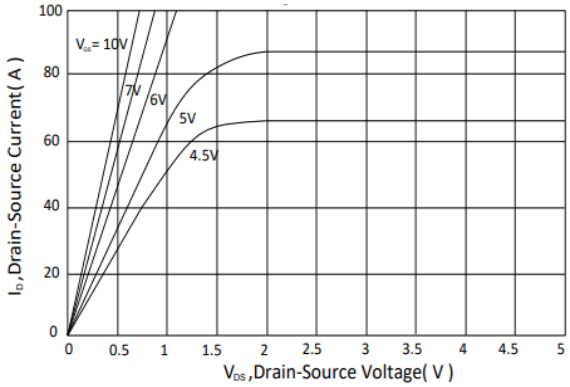


Figure 2. On-Resistance vs. Gate-Source Voltage

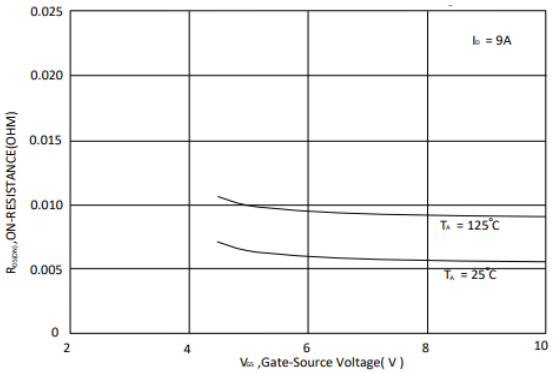


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

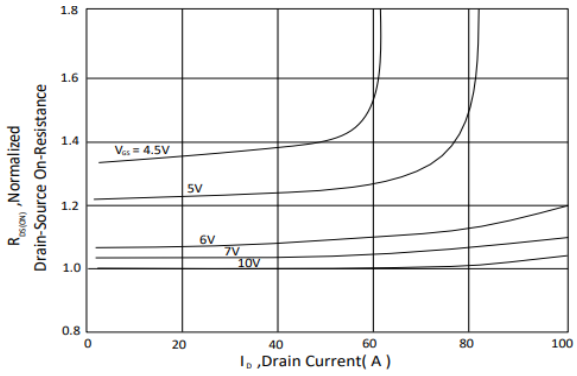


Figure 4. Normalized On-Resistance vs. Junction Temperature

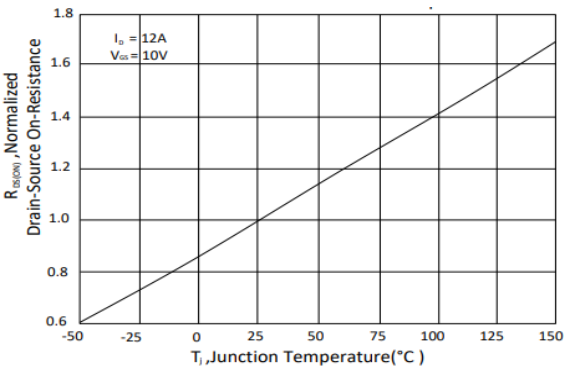


Figure 5. Typical Transfer Characteristics

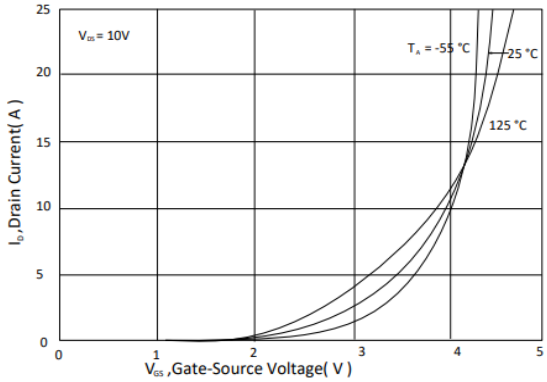


Figure 6. Typical Source-Drain Diode Forward Voltage

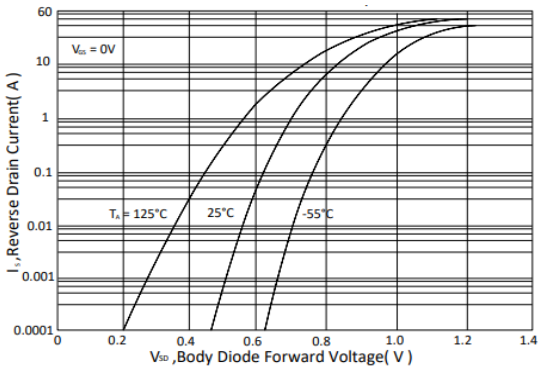


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

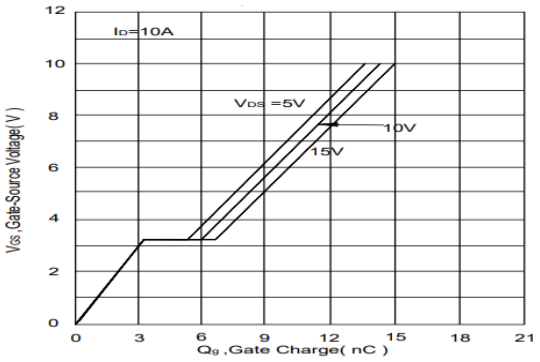


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

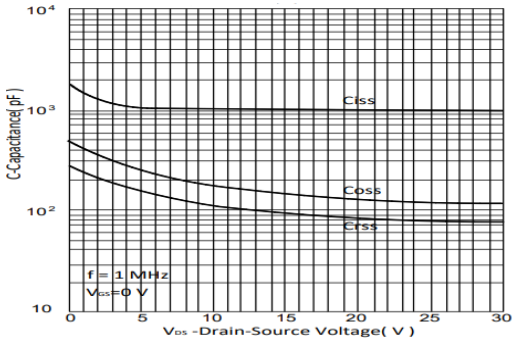


Figure 9. Maximum Safe Operating Area

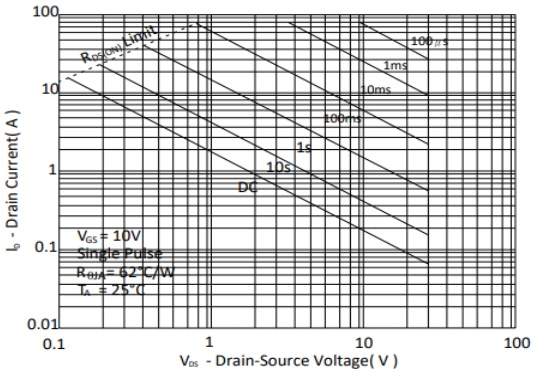


Figure 10. Single Pulse Maximum Power Dissipation

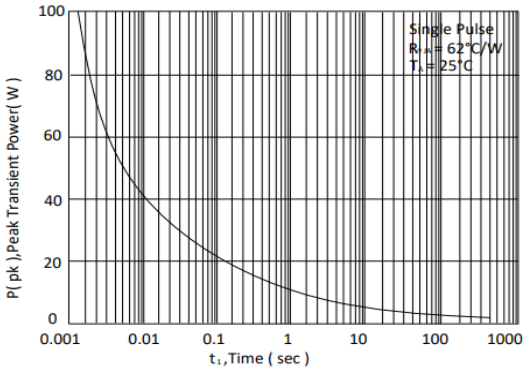
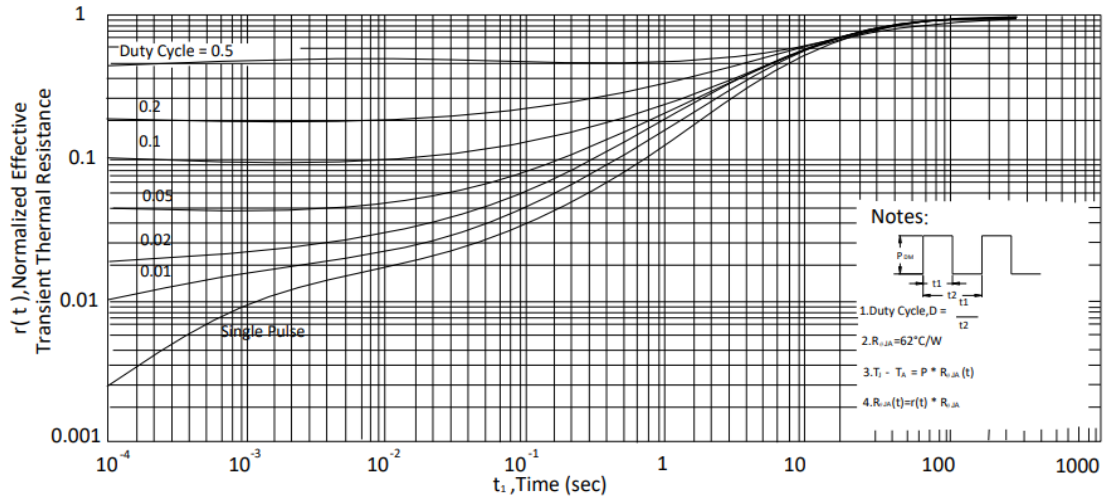


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



Q2 Electrical Characteristics at T_j=25℃ (unless otherwise specified)

Static Characteristics

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250μA	1	1.5	3	
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V, V_{DS}=24V, T_j=25℃	-	-	1	μA
		V_{GS}=0V, V_{DS}=20V, T_j=125℃	-	-	25	
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Drain to Source on Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=20A	-	2.5	3.5	mΩ
		V_{GS}=4.5V, I_D=15A	-	3.5	4.7	
Transconductance	g_{fs}	V_{DS}=5V, I_D=20A	-	95	-	S
Gate Resistance	R_G	V_{GS}=15mV, V_{DS} =0V, f=1MHz	-	2.5	-	Ω

Dynamic Characteristics

Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, f=1MHz	-	2200	-	pF
Output Capacitance	C_{oss}		-	427	-	
Reverse Transfer Capacitance	C_{rss}		-	231	-	
Total Gate Charge	Q_g(10V)	V_{DD}=15V, I_D=10A, V_{GS}=10V	-	32	-	nC
	Q_g(4.5V)		-	17	-	
Gate to Source Charge	Q_{gs}		-	4.1	-	
Gate to Drain (Miller) Charge	Q_{gd}		-	8.5	-	
Turn on Delay Time	$t_{d(on)}$	V_{DD}=15V, I_D=1A, V_{GS}=10V, R_G=2.7Ω,	-	15	-	ns
Rise time	t_r		-	10	-	
Turn off Delay Time	$t_{d(off)}$		-	50	-	
Fall Time	t_f		-	15	-	

Reverse Diode Characteristics

Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_F=10A	-		1.2	V
Reverse Recovery Time	t_{rr}	I_F=10A, dI_F/dt=100A/μs	-	30	-	ns
Reverse Recovery Charge	Q_{rr}		-	10	-	nC

Fig 1. Typical Output Characteristics

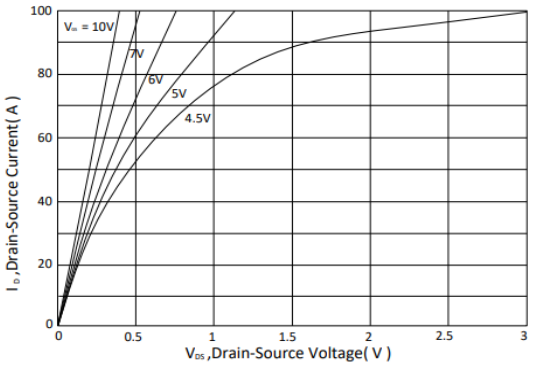


Figure 2. On-Resistance vs. Gate-Source Voltage

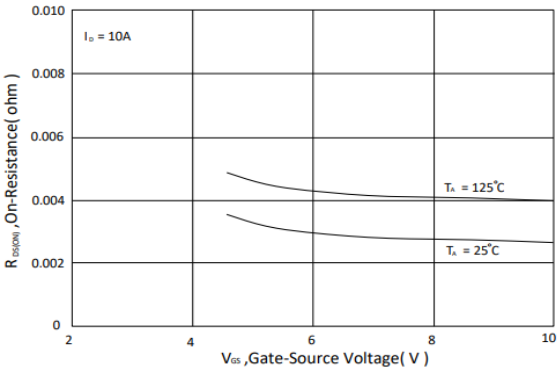


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

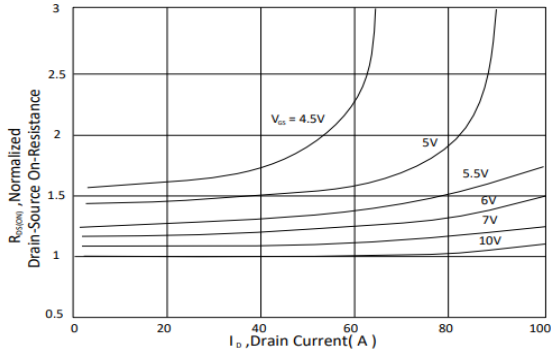


Figure 4. Normalized On-Resistance vs. Junction Temperature

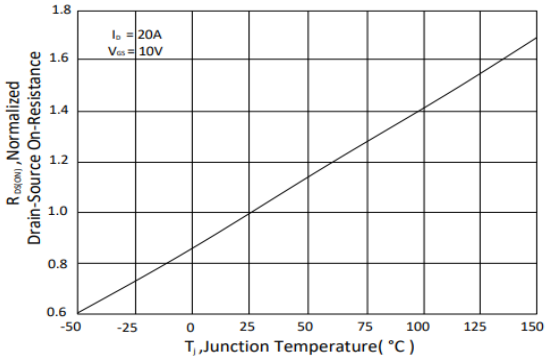


Figure 5. Typical Transfer Characteristics

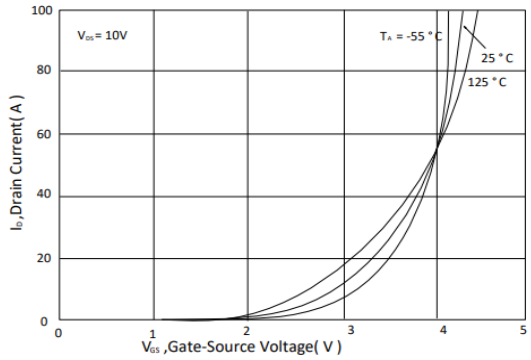


Figure 6. Typical Source-Drain Diode Forward Voltage

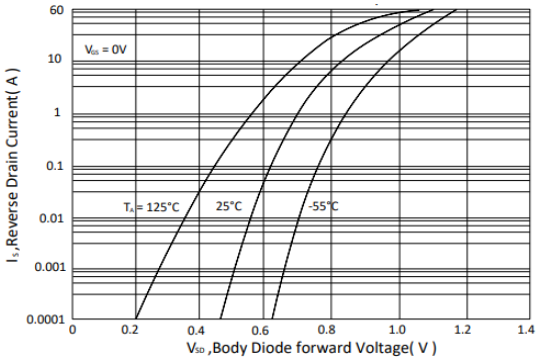


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

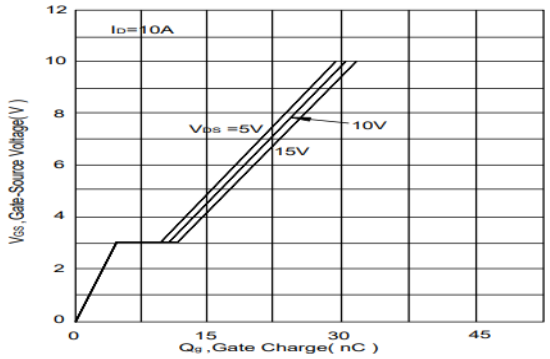


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

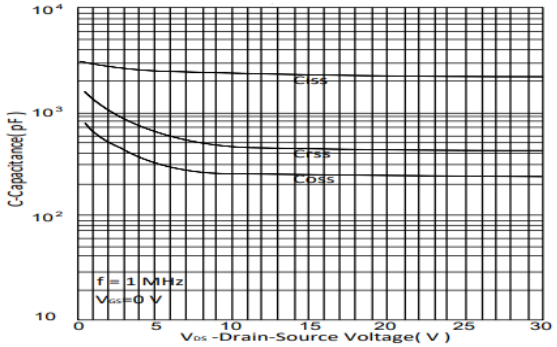


Figure 9. Maximum Safe Operating Area

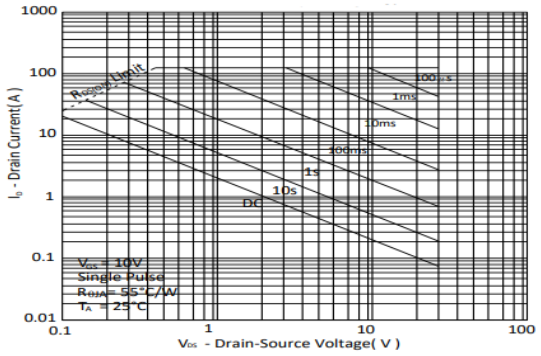


Figure 10. Single Pulse Maximum Power Dissipation

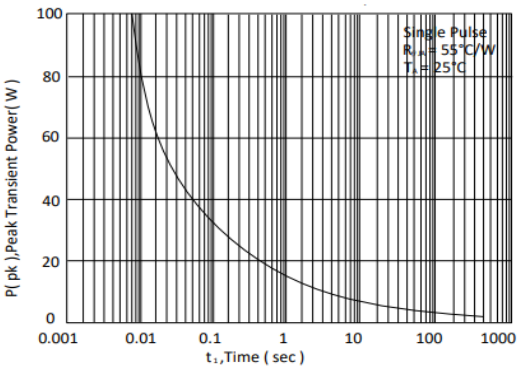
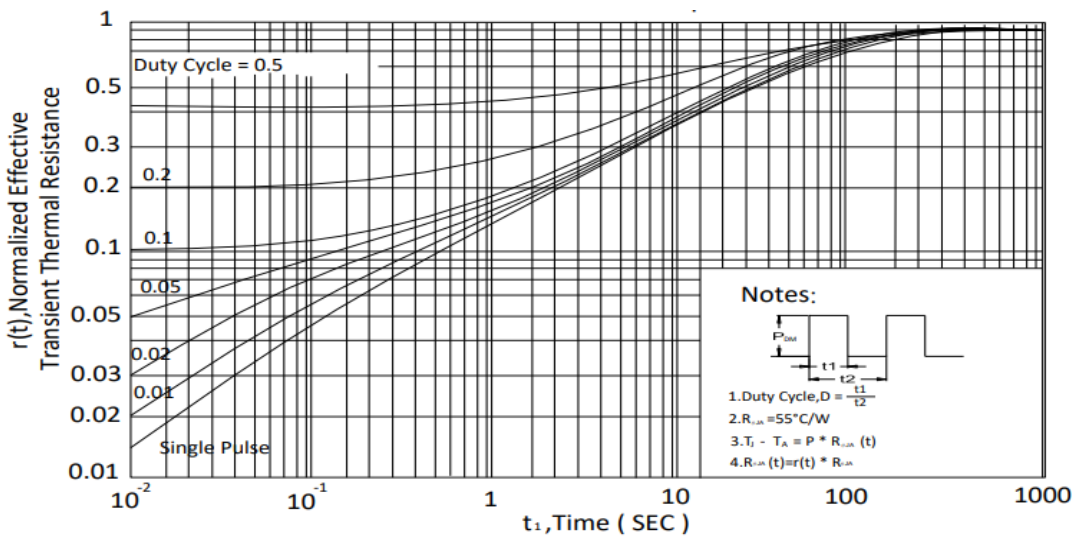
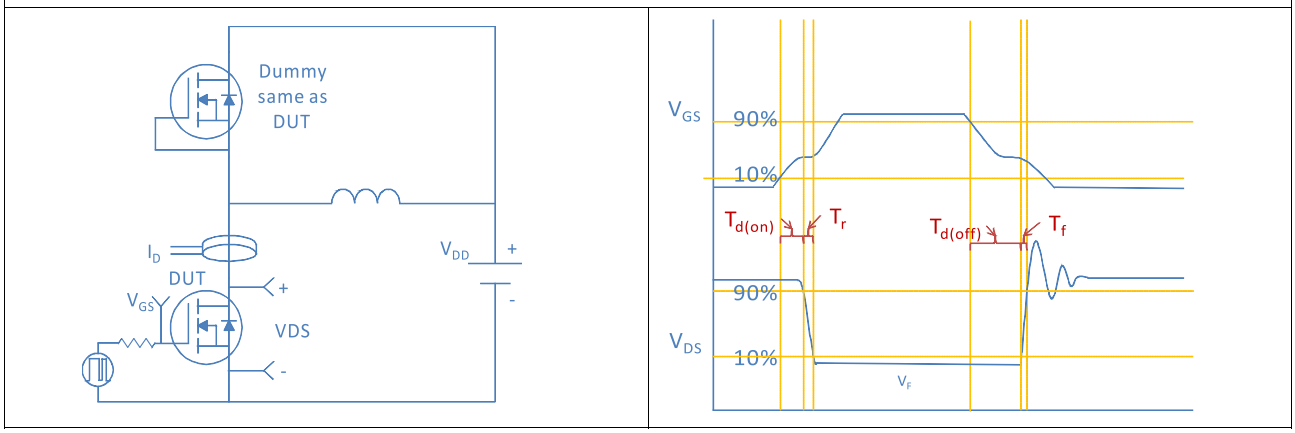


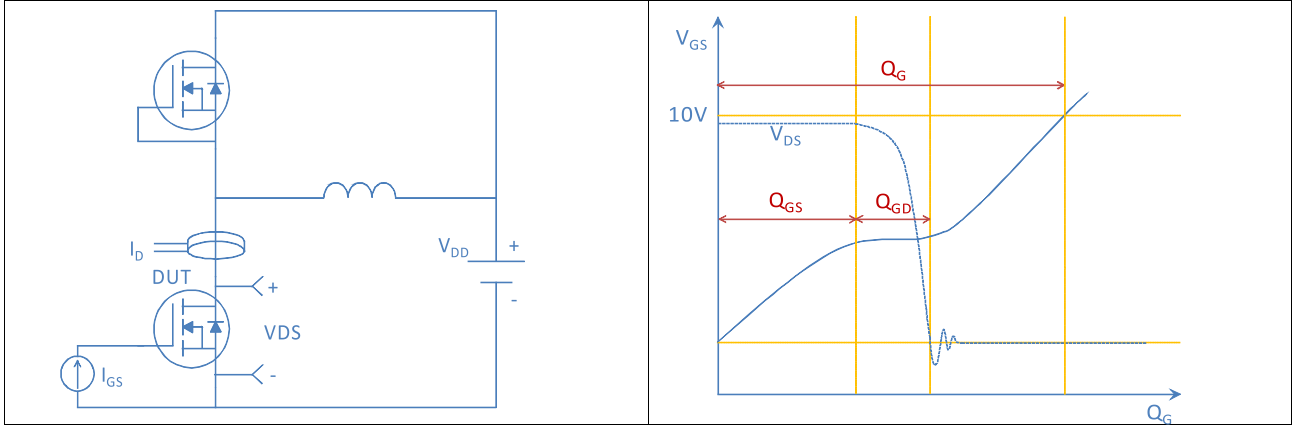
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



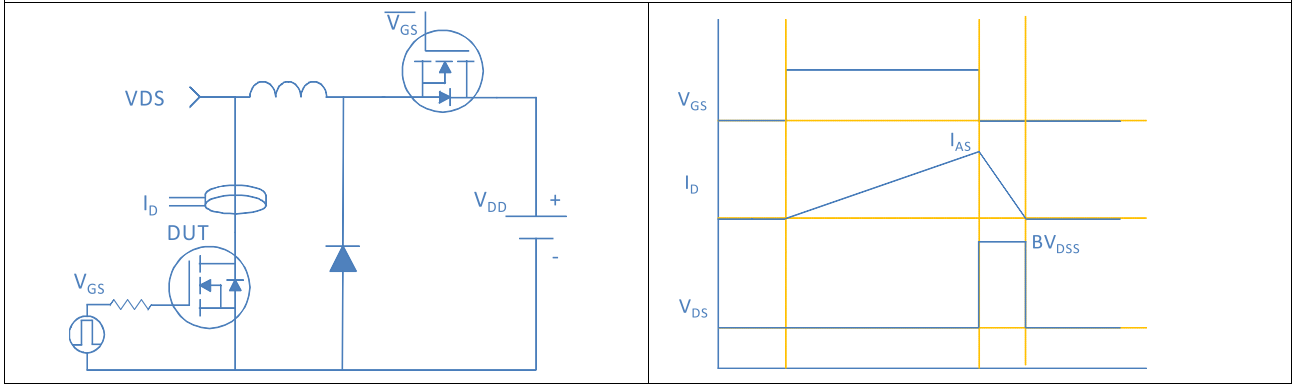
Inductive switching Test



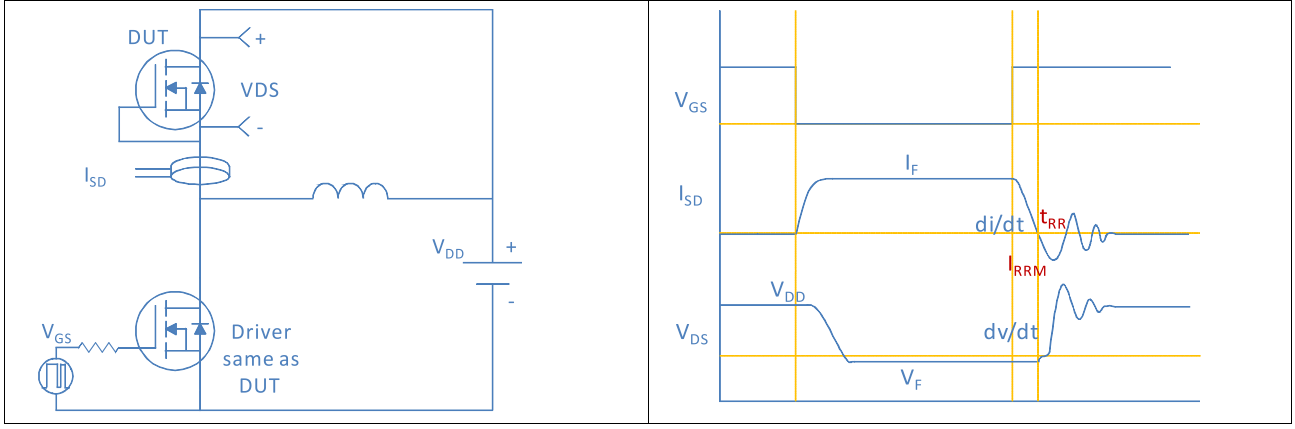
Gate Charge Test



Uclamped Inductive Switching (UIS) Test

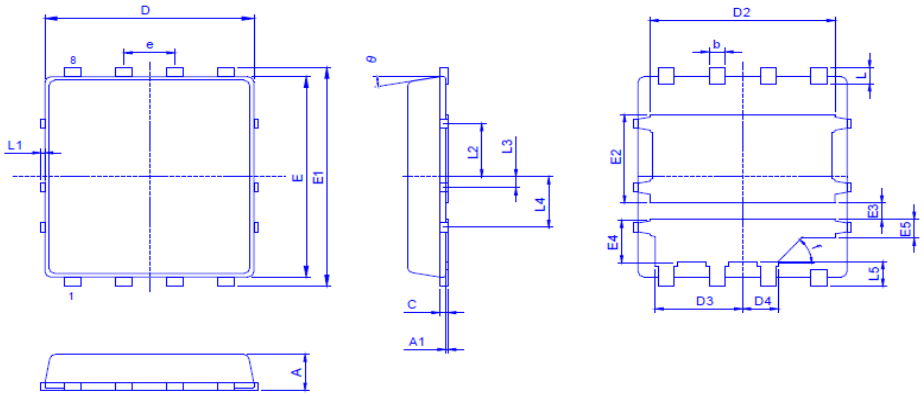


Diode Recovery Test



Package Outline

DFN5*6, 8leads



Dimension in mm

Dimension	A	A1	b	c	D	D2	D3	D4	E	E1	E2	E3	E4	E5
Min.	0.85	0.00	0.35	0.15		4.5	2.125	0.835			2.4	0.40	1.125	0.475
Typ.	0.90		0.40	0.20	5.2	4.6	2.175	0.885	5.55	6.05	2.45	0.45	1.175	0.525
Max.	1.00	0.05	0.45	0.25		4.7	2.225	0.935			2.5	0.50	1.225	0.575

Dimension	e	L	L1	L2	L3	L4	L5	F	θ
Min.		0.35	0	1.375	0.2	1.3	0.575		0°
Typ.	1.27	0.45		1.475	0.3	1.4	0.675	45°	
Max.		0.55	0.1	1.575	0.4	1.5	0.775		10°